
हरी कॉफ़ी — विशिष्टि

(तीसरा पुनरीक्षण)

Green Coffee — Specification

(*Third Revision*)

ICS 67.140.20

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FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Stimulant Foods Sectional Committee had been approved by the Food and Agriculture Division Council.

This standard was first published in 1966 and subsequently revised in 1974 and 1982. The first revision of this standard was brought out to include determination of moisture content with a view to aligning it with the practical method adopted by the ISO. The second revision of the standard was carried out to reflect the latest trade practices followed by the Coffee Board with respect to grade designations.

A scheme for labelling environment friendly products with the ECO Mark was introduced at the instance of the Ministry of Environment and Forests (MoEF), Government of India. The ECO Mark would be administered by the Bureau of Indian Standards (BIS) under the *Bureau of Indian Standards Act, 2016* as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR No. 85(E) dated 21 February 1991. For a product to be eligible for ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environmental friendly (EF) requirements. The EF requirements for grading of green coffee, are, therefore being included through an Amendment No. 1 to this standard. Amendment No. 1 was based on the Gazette Notification No. 678 (E) dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.

The third revision is being carried out to incorporate the new grades of coffee introduced by the Coffee Board which are popular in both domestic and international trade along with the incorporation of Eco mark requirements issued via amendments.

In the formulation of this standard, due consideration has been given to the provisions of the *Food Safety and Standards Act, 2006* and the Rules framed thereunder and the *Legal Metrology (Packaged Commodities) Rules, 2011*. However, this standard is subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GREEN COFFEE — SPECIFICATION

(Third Revision)

1 SCOPE

This standard prescribes the requirements for different types and grades of green coffee, namely, *Coffea arabica Linn.* and *Coffea caenophora* (subvariety *C. robusta Linden*).

2 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

2.1 Plantation Triage — Broken, withered, spotted, elephant, small discoloured malformed beans, pales and pulper-cuts.

2.2 Robusta Parchment and Cherry Triage — Round small beans, spotted beans, dried and shrivelled beans, broken beans (not less than one-third of a bean in size). In the case of Robusta parchment triage, pales and pulper-cuts are also included.

2.3 Bits — Broken coffee of less than one third of a bean in size.

2.4 Blacks — More than a quarter of bean surface black, blue, brown or similarly discoloured beans and including stinkers and sour beans.

3 VARIETIES AND TYPES

3.1 There are mainly two varieties of coffee as given below:

- a) Variety I — *Coffea arabica Linn.* and
- b) Variety II — *Coffea caenophora* (subvariety *C. robusta Linden*).

3.2 There shall be six types of coffee as given below:

- a) Arabica Plantation (washed);
- b) Arabica Cherry (unwashed);
- c) Robusta Parchment (washed);
- d) Robusta Cherry (unwashed);
- e) Mysore Nuggets EB;
- f) Robusta Kaapi Royale; and
- g) Monsooned Malabar Coffees (*see IS 4074*).

4 REQUIREMENTS

4.1 Moisture Content

When determined by the method prescribed in Annex A, the moisture content in coffee at the time of packing shall be as given in Table 1.

Table 1 Moisture Content in Coffee

(Clause 4.1)

SI No.	Types of Coffee	Moisture Content (Percent)
(1)	(2)	(3)
i)	Arabica, Plantation (washed)	10.5
ii)	Arabica Cherry (unwashed)	11.5
iii)	Robusta Parchment (washed)	10.5
iv)	Robusta Cherry (unwashed)	11.5
v)	Mysore Nuggets EB	9.0-10.5
vi)	Robusta Kaapi Royale	9.0-10.5
vii)	Monsooned Malabar Coffees	13.0-14.5

NOTES:

- 1 A tolerance of + 0.5 percent in moisture content is permissible.
- 2 Moisture standards for the premium grades will be the same as those of the type to which they belong.
- 3 Please refer to the glossary appended at the end for definitions of coffee terms.

4.2 Aperture Size of Test Sieves Used in Coffee and Their Corresponding Screen Number (see Table 2)

Table 2 Aperture Size of Test Sieves Used in Coffee and their Screen Number

(Clause 4.2)

SI No.	Aperture Size (Diameter of Round Holes in mm)	Screen No.
i)	7.50	19
ii)	7.25	Between 19 and 18
iii)	7.10	18
iv)	6.70/6.65	17
v)	6.50	Between 17 and 16
vi)	6.30	16
vii)	6.00	15
viii)	5.60/5.50	14
ix)	5.00	13

4.3 Freedom from Infestation

Coffee beans shall be free from infestation due to insects, fungi and rodents.

4.4 Freedom from Extraneous Matter

Coffee beans shall be free from any extraneous matter, such as strings, stones, dirt, wood and glass, and metallic pieces.

4.5 Odour

Coffee beans shall be free from any foreign odour.

4.6 Requirements for ECO Mark

4.6.1 General Requirements

4.6.1.1 The product shall conform to the quality standards of Bureau of Indian Standards.

4.6.1.2 The product manufacturer shall produce the consent clearance as per the provisions of *Water (Prevention and Control of Pollution) Act, 1974* and *Air (Prevention and Control of Pollution) Act, 1981*, *Water (Prevention and Control of Pollution) Cess Act, 1977* respectively along with the authorisation if required, under *Environment (Protection) Act, 1986* and the Rules made thereunder to Bureau of Indian Standards while applying for the ECO Mark; and the product shall be in accordance with the *Prevention of Food Adulteration Act, 1954* and the Rules made thereunder unless otherwise specified.

4.6.1.3 The product/packing shall display in brief the criteria based on which the product has been labelled environment friendly.

4.6.1.4 The material used for product/packaging shall be recyclable (that is, which can be reprocessed to manufacture any other useful product) or biodegradable and the parameters evolved under the SLEFP on the specific subject of packaging shall apply.

4.6.2 Specific Requirements

4.6.2.1 The coffee beans shall be free from infestation due to insects, fungi and rodents.

4.6.2.2 The product shall be free from extraneous matter like strings, stones, dirt, wood, glass and metallic pieces and from any added colouring and flavouring. It shall also be free from rancidity and shall have its characteristic flavour.

4.6.2.3 The product shall be free from adulterants like dandelion and other roots, nerons, figs, dates, stones and cereals.

4.6.2.4 The pesticides residues (if any) in the product shall not exceed the limits as prescribed in

Food Safety and Standards (Contaminants, Toxins and Residues) Regulations, 2011, when tested by the methods given in the relevant Indian Standards specifications.

5 GRADING AND GARBLING (SORTING) OF GREEN COFFEE

Grading and garbling of Indian coffee is based on the size of the coffee beans and percentage of imperfections. In the Indian system of grading and garbling, the tolerance level for each and every grade is specified and expressed in percentage by weight. Quality specifications for Indian coffee entail that all the grades be totally free from foreign and extraneous matters.

5.1 There shall be four broadly categorized grades of the washed and unwashed Arabicas and Robustas as given below:

- a) Commercial grades;
- b) Premium grades;
- c) Specialty coffees; and
- d) Miscellaneous grades.

5.2 Coffee beans shall be graded on the basis of size and shape before packing.

5.3 The designation of grades and their requirements shall be as given in **5.3.1** to **5.3.4**.

5.3.1 Commercial Grade

- a) Arabica coffee.

- 1) Washed Arabica 'Plantation' — The grade designations of Arabica plantation coffee are:
 - i) Plantation PB;
 - ii) Plantation A;
 - iii) Plantation B
 - iv) Plantation C;
 - v) Plantation blacks;
 - vi) Plantation bits; and
 - vii) Plantation bulk.

Quality Specifications

1. Plantation PB

Sieve standard	No sieve requirement
Garbling status	Clean garbled
Tolerance	
Flats (AB)	2 percent by weight
PB triage	3 percent by weight

2. Plantation A

Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.65 mm (screen 17). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 6.00 mm (screen 15).
Garbling status	Clean garbled
Tolerance	
PB	2 percent by weight
Triage	2 percent by weight

3. Plantation B

Sieve standard	Minimum 75 percent by weight retention on a sieve with round holes of 6.00 mm (screen 15). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 5.50 mm (screen 14).
Garbling status	Clean garbled
Tolerance	
PB	2 percent by weight
Triage	3 percent by weight

4. Plantation C

Sieve standard	Minimum 75 percent by weight retention on a sieve with round holes of 5.50 mm (screen 14). 100 percent by weight shall stand on a sieve with round holes of 5.00 mm (screen 13).
May include	Triage, small whole beans of the prescribed sieve size, light beans, boat-shaped beans and spotted beans (less than quarter of a bean surface).
Shall be free from	Blacks and damaged beans.

5. Plantation Blacks

Sieve standard	100 percent by weight retention on a sieve with round holes of 5.00 mm (screen 13).
May include	Black beans with more than a quarter of the bean surface black, deep blue or dark brown. It shall include damaged beans such as bleached (spongy) beans, insect-damaged beans, spotted (more than a quarter of a bean surface) beans, stinker and sour beans.

6. Plantation Bits

Sieve standard	100 percent by weight shall pass through a sieve with round holes of 5.00 mm (screen 13).
Garbling status	Un-garbled
May contain	Broken beans of less than 1/3 of a bean size, blacks/ Browns and defective beans of the prescribed size.

May include**7. Plantation Bulk**

Grading	Ungraded
Presence of blacks/Browns/ bits	Shall not contain more than 2 percent by weight

2) *Unwashed Arabica-'Arabica Cherry'* — The grade designations of Arabica Cherry coffees are:

- Arabica cherry PB;
- Arabica cherry AB;
- Arabica cherry C;
- Arabica cherry blacks/ browns;

- v) Arabica cherry bits; and
- vi) Arabica cherry bulk.

Quality Specifications

1. Arabica Cherry PB

Sieve standard	No sieve requirement
Garbling status	Clean garbled
Tolerance	
Flats (AB)	2 percent by weight
PB triage	3 percent by weight

2. Arabica Cherry AB

Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.00111m (Screen 15). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 5.50mm (Screen 14).
Garbling status	Clean garbled
Tolerance	
PB	2 percent by weight
Triage	3 percent by weight

3. Arabica Cherry C

Sieve standard	Minimum 75 percent by weight retention on a sieve with round holes of 5.50mm (screen 14). 100 percent by weight shall stand on a sieve with round holes of 5.00 mm (screen 13).
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4. Arabica Cherry Blacks/Browns

Sieve standard	100 percent by weight retention on a sieve with round holes of 5.00 mm (screen 13).
May include	Black/dark brown beans, damaged beans such as bleached (spongy) beans, insect-damaged beans, spotted (more than a quarter of a bean surface) beans, fungal-damaged beans, sour and greens.

5. Arabica Cherry Bits

Sieve Standard	100 percent by weight shall pass through a sieve with round holes of 5.00 mm (screen 13).
Garbling Status	Un-garbled
May contain	Broken beans of less than 1/3 of a bean size, blacks/ Browns and defective beans of the prescribed size.

6. Arabica Cherry Bulk

Grading	Ungraded
Presence of blacks/browns/ bits	Shall not contain more than 10 percent by weight.

b) Robusta coffee

- 1) *Washed Robusta 'Robusta Parchment'* — The grade designations of Robusta Parchment coffees are:
 - i) Robusta parchment PB;
 - ii) Robusta parchment AB;
 - iii) Robusta parchment C;
 - iv) Robusta parchment blacks/browns;
 - v) Robusta parchment bits; and
 - vi) Robusta parchment bulk .

Quality Specifications

1. Robusta Parchment PB

Sieve standard	No sieve requirement
Garbling status	Clean garbled
Tolerance	
Flats (AB)	2 percent by weight
PB triage	3 percent by weight

2. Robusta Parchment AB

Sieve Standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.00 mm (screen 15). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 5.50 mm (screen 14)
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Garbling Status	Clean garbled	6. Robusta Parchment Bulk
Tolerance		Grading Ungraded
PB	2 percent by weight	Presence of Shall not contain more than
Triage	3 percent by weight	blacks/ Browns/ 2 percent by weight Bits
3. Robusta Parchment C		2) Unwashed Robusta -‘Robusta Cherry — The grade designations of Robusta Cherry coffee are:
Sieve standard	Minimum 75 percent by weight retention on a sieve with round holes of 5.50 mm (screen 14). 100 percent by weight shall be retained on a sieve with round holes of 5.00 mm (screen 13).	i) Robusta cherry PB; ii) Robusta cherry AB; iii) Robusta cherry C; iv) Robusta cherry blacks/browns; v) Robusta cherry bits; vi) Robusta cherry bulk; and vii) Robusta cherry clean bulk.
May include	Triage, small whole beans of the prescribed sieve size, light beans, boat-shaped beans and spotted beans (less than a quarter of a bean surface). It shall not contain more than 2 percent of blacks/browns or bits.	
4. Robusta Parchment blacks/browns		
Sieve standard	100 percent by weight retention on a sieve with round holes of 5.00 mm (screen 13).	Sieve standard No sieve requirement Garbling status Clean garbled Tolerance Flats (AB) 2 percent by weight PB Triage 3 percent by weight
May include	Blacks/dark brown beans, damaged beans, such as bleached (spongy) beans, insect-damaged beans, spotted (more than a quarter of a bean surface) beans, stinker and sour beans	
5. Robusta Parchment Bits		
Sieve standard	100 percent by weight shall pass through a sieve with round holes of 5.00 mm (screen 13).	2. Robusta Cherry AB Sieve standard Minimum 90 percent by weight retention on a sieve with round holes of 6.00 mm (screen 15). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 5.50 mm (screen 14). Garbling status Clean garbled Tolerance PB 2 percent by weight Triage 3 percent by weight
Garbling status	Ungarbled	
May contain	Broken beans of less than 1/3 of a bean size, blacks/browns and defective beans of the prescribed size.	3. Robusta Cherry C Sieve standard Minimum 75 percent by weight retention on a sieve with round holes of 5.50 mm (screen 14). 100 percent by weight shall stand on a sieve with round holes of 5.00 mm (screen 13).

	May include	May include	Triages small whole beans of the prescribed sieve size, light beans, boat shaped beans and spotted beans (less than a quarter of a bean surface). It shall not contain more than 2 percent of blacks/browns or bits.	4.2.2 Premium Grades
4.	Robusta Cherry Blacks/Browns			a) Arabica coffee
	Sieve standard	100 percent by weight retention on a sieve with round holes of 5.00 mm (screen 13).		1) Washed Arabica — ‘Plantation’
	May include	Black/dark brown beans, damaged beans such as bleached (spongy) beans, insect-damaged beans, spotted (more than a quarter of a bean surface) beans, fungal-damaged beans, sour and greens.		Quality Specifications
5.	Robusta Cherry Bits			1. Plantation AA
	Sieve standard	100 percent by weight shall pass through a sieve with round holes of 5.00 mm (screen 13).	Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 7.10mm (screen 18). 100 percent shall stand on a sieve with round holes of 6.65 mm (screen 17). The 10 percent beans passing through the sieve of 7.10 mm and standing on the sieve of 6.65mm shall be whole beans.
	Garbling status	Ungarbled	Garbling status	Clean garbled
	May contain	Broken beans of less than 1/3 of a bean size, blacks/browns and defective beans of the prescribed size.	Tolerance	
			PB	2 percent by weight
6.	Robusta Cherry Bulk			2. Plantation PB Bold
	Grading	Ungraded	Sieve standard	100 percent by weight retention on a sieve with oblong holes of 4.75 mm (screen 12 oblong).
	Presence of blacks/ browns/ bits	Shall not contain more than 10 percent by weight	Garbling status	Clean garbled
			Tolerance	
			AB	2 percent by weight
			PB triage	2 percent by weight
7.	Robusta Cherry Clean Bulk			2) Unwashed Arabica — ‘Arabica Cherry’
	Grading	Ungraded	Quality Specifications	
	Shall be free from	Blacks/brown/bits	1. Arabica Cherry AA	
			Sieve Standard	Minimum 90 percent by weight retention on a sieve with round holes of 7.10 mm (screen 18). 100 percent retention on a sieve with round holes of 6.65 mm (screen 17).
			Garbling status	Clean garbled
			Tolerance	
			PB	2 percent by weight
			Triage	1 percent by weight

2. Arabica Cherry A		Garbling status	Clean garbled
Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.65mm (screen 17). 100 percent by weight shall stand on a sieve with round holes of 6.00 mm (screen 15).	Tolerance	
Garbling status	Clean garbled	AB	2 percent by weight
Tolerance		Triage	2 percent by weight
PB			
Triage			
3. Arabica Cherry PB Bold		2) Unwashed Robusta — ‘Robusta Cherry’	
Sieve standard	100 percent by weight retention on a sieve with oblong holes of 4.75 mm (screen 12 oblong).	Quality Specifications	
Garbling status	Clean garbled	1. Robusta Cherry AA	
Tolerance		Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 7.10 mm (screen 18). 100 percent retention on a sieve with round holes of 6.65 mm (screen 17).
AB		Garbling status	Clean garbled
Triage		Tolerance	
		PB	2 percent by weight
		Triage	1 percent by weight
b) Robusta coffee		2. Robusta Cherry A	
1) Washed Robusta — ‘Robusta Parchment’		Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.65 mm (screen 17). 100 percent by weight shall stand on a sieve with round holes of 6.00 mm (screen 15).
Quality Specifications		Garbling status	Clean garbled
1. Robusta Parchment A		Tolerance	
Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.65 mm (screen 17). 100 percent shall stand on a sieve with round holes of 6.00 mm (screen 15).	PB	2 percent by weight
Garbling status	Clean garbled	Triage	2 percent by weight
Tolerance			
PB		3. Robusta Cherry PB Bold	
Triage		Sieve standard	100 percent by weight retention on a sieve with oblong holes of 4.50 mm (screen 11 oblong).
		Garbling status	Clean garbled
		Tolerance	
		AB	2 percent by weight
		PB Triage	2 percent by weight
2. Robusta Parchment PB Bold			
Sieve standard	100 percent by weight retention on a sieve with oblong holes of 4.50 mm (screen 11 oblong).		

5.3.3 Specialty Coffees**a) Mysore nuggets extra bold****Arabica Plantation (Washed Coffee)**

Region of growth	Shall be prepared from plantation A coffees of Mysore, Coorg, Bababudan, Biligiris and Shevaroys.	Free from PB, broken (inclusive of Triage and Elephant beans) or any extraneous matter. Defectives including bleached and spongy beans, unwashed beans, blacks, browns, insect damaged beans, fungal damaged beans and pulper cuts.
Sieve standard	Minimum 90 percent retention on a sieve with round holes of 7.50 mm (screen 19). 100 percent retention on a sieve with round holes of 6.65 mm (screen 17). The 10 percent beans passing through the sieve of 7.50 mm and standing on the sieve of 6.65 mm shall be whole beans	
Processing/garbling standard	Medium to well-polished, clean garbled	
Free from	PB, broken (inclusive of Triage and Elephant beans) or any extraneous matter. Defectives including bleached and spongy beans, blacks, browns, insect damaged beans, fungal damaged beans and pulper cuts.	

b) Robusta Kaapi Royale**Robusta Parchment (Washed Coffee)**

Region of growth	Shall be prepared from Robusta parchment AB coffee of Mysore, Coorg, Malabar, Wayanad, Shevaroys, Pulneys and Bababudan regions.	
Sieve standard	Minimum 90 percent retention on a sieve with round holes of 6.70 mm (Screen 17). 100 percent retention on a sieve with round holes of 6.00 mm (screen 15). The 10 percent beans passing through the sieve of 6.70 mm and standing on the sieve of 6.00 mm shall be whole beans.	
Processing/garbling standard	Medium to well-polished, clean garbled	

Free from**c) Monsooned Malabar coffees**

- 1) *Monsooned Malabar Arabica Coffees (prepared from Arabica cherry coffee)* — The grade designations of Monsooned Malabar Arabica Coffees are:
 - i) Monsooned Malabar AAA;
 - ii) Monsooned Malabar AA;
 - iii) Monsooned Malabar A; and
 - iv) Monsooned Malabar Arabica Triage.

1. Monsooned Malabar AAA

Sieve standard	Minimum 90 percent by weight retention on sieve with round holes of 7.50 mm (screen 19). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 7.10 mm (screen 18).
Garbling status	Clean garbled
Tolerance	

Triage	Maximum 2 percent by weight
BBB	Nil

2. Monsooned Malabar AA

Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 7.10 mm (screen 18). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 6.70 mm (Screen 1).
Garbling status	Clean garbled
Tolerance	

Triage	Maximum 2 percent by weight
BBB	Nil

3. Monsooned Malabar A	2. Monsooned Malabar Robusta Triage
Sieve standard	Minimum 75 percent by weight retention on a sieve with round holes of 6.70 mm (screen 17). Not more than 1.5 percent by weight shall pass through a sieve with round holes of 6.00 mm (screen 15).
Tolerance	
Triage	Maximum 3 percent by weight
BBB	Nil
4. Monsooned Malabar Arabica Triage	
Sieve standard	Minimum 90 percent by weight retention on a sieve with round holes of 6.00 mm (screen 15).
Tolerance	
BBB	3 percent
2) <i>Monsooned Malabar Robusta Coffees (Prepared from Robusta cherry coffee)</i> — The grade designations of Robusta Monsooned Malabar Coffees are:	
	i) Monsooned Malabar Robusta RR; and
	ii) Monsooned Malabar Robusta Triage.
1. Monsooned Malabar Robusta RR	
Sieve standard	Minimum 90 percent by weight retention on sieve with round holes of 7.10 mm (screen 18). Not more than 1.5 percent by weight shall pass (screen 17).
Garbling status	Clean garbled
Tolerance	
Triage	Maximum 3 percent by weight
BBB	Nil

5.3.4 Miscellaneous Grades

1. Liberica Bulk (Bulk coffee from Liberica)

Grading Ungraded
 Presence of Shall not contain more than
 blacks, browns/ 20 percent by weight.
 bits

2. Excelsia Bulk (Bulk coffee from Excelsia)

Grading Ungraded
 Presence of Shall not contain more than
 blacks, browns/ 20 percent by weight.
 bits

6 PACKING AND MARKING

6.1 Packing

The coffee beans shall be packed in new, clean and sound jute or lined bags or any other suitable container as agreed to between the purchaser and the vendor. The bags shall be free from any fungal or insect infestation and shall be free from any undesirable smell.

6.2 Marking

6.2.1 The following particulars shall be marked or labelled on each bag:

- Name of the material;
- Variety and type;
- Grade of the material;
- Name and address of the vendor; and
- Net mass, in kg;
- Directions for storage; and
- Any other information required under the *Legal Metrology (Packaged Commodities) Rules, 2011*

and the *Food Safety and Standards (Packaging and Labelling) Regulations, 2011* and the *Food Safety and Standards Act, 2006*.

6.2.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau*

of *Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

6.2.3 The product may also be marked with ECO Mark and the details are available with the Bureau of Indian Standards.

ANNEX A

(Clause 4.1)

DETERMINATION OF MOISTURE

A-0 PRINCIPLE

Dry the sample of beans at a temperature of $130 \pm 2^\circ\text{C}$, at atmospheric pressure, in two stages with an intermediate rest period, in order to redistribute uniformly the moisture in the bean.

A-1 APPARATUS**A-1.1 Electrically Heated Constant — Temperature Oven**

The oven shall have effective ventilation and shall be regulated in such a way that the temperature of the air and of the plates carrying the samples is $130 \pm 2^\circ\text{C}$ in the vicinity of the samples. The oven shall have such heating capacity that when it is previously set at a temperature of 130°C , it is again able to reach this temperature in less than 45 min (preferably in less than 30 min) after the insertion of the maximum number of test portions that can be dried simultaneously.

A-1.2 Dish with Lid

This shall be of corrosion resistant metal or of glass, with an effective surface area of at least 18 cm^2 (for example, 50 mm minimum diameter and 25 to 30 mm deep).

A-1.3 Desiccator

Phosphorous pentoxide, reagent grade, or any other effective dehydrating agent shall be used in the desiccator.

A-1.4 Analytical Balance**A-2 PROCEDURE****A-2.1 Test Portion**

Weigh the empty dried dish with its lid. Introduce approximately 5 g of green coffee beans and spread them over the bottom of the dish in a single layer. If the test portion contains a large quantity of impurities (nails, stones, wood, etc.) discard the test portion and take a fresh portion from the laboratory sample. Cover the dish with its lid and weigh the dish with lid and the test portion to the nearest 0.000 2 g.

A-2.2 Determination**A-2.2.1 First Period in the Oven**

Place the dish containing the test portion in the oven at a temperature of the 130°C , on its lid. Remove it after a

period of $6 \text{ h} \pm 15 \text{ min}$; cover it with the lid while still in oven and place it in the desiccator. After cooling to ambient temperature (from 30 to 40 min after placing it in the desiccator), weigh it, still closed. After weighing, replace the dish in the desiccator for at least 15 h.

A-2.2.2 Second Period in the Oven

Under the same conditions as specified in **A-2.2.1**, replace the dish in the oven at a temperature of 130°C and let it remain there for $4 \text{ h} \pm 15 \text{ min}$. Remove it, allow it to cool to ambient temperature in the desiccator and weigh again.

A-2.2.3 Number of Determinations

Carry out at least two determinations on the same sample till the difference in results of last two determinations is not more than 0.3 g of moisture per 100 g of the sample.

A-3 CALCULATION

A-3.1 The percentage of moisture in the sample shall be calculated by adding the percent loss in mass calculated after the first period in the oven (see **A-2.2.1**) and half the value of the addition percent loss in mass calculated after the second period in the oven (see **A-2.2.2**).

A-3.1.1 Loss in Mass after the First Period in Oven (P_1)

Calculate percent loss in mass using the following formula:

$$P_1 = \frac{(m_0 - m_1) \times 100}{m_0}$$

where,

m_0 = initial mass, in g of the test portion; and

m_1 = mass in g, of the test portion after the first 6 h period.

A-3.1.2 Loss in Mass after the second Period in Oven (P_2)

Calculate percent loss in mass using the following formula:

$$P_2 = \frac{(m_0 - m_2) \times 100}{m_0}$$

where,

m_0 = initial mass in g, of the test portion; and

m_2 = mass in g, of the test portion after the second 4 h period in the oven.

A-3.1.3 Moisture Content, Percent by Mass (P)

Calculate moisture content (percent by mass) using the following formula (see Note):

$$P = P_1 + \frac{P_2 - P_1}{2}$$

NOTE — The difference between the losses in mass observed after 6 h (see A-2.2.1) and 10 h (including additional 4 h) (see A-2.2.2) in the oven at a temperature of 130°C, that is, the difference between P_1 and P_2 , should normally be less than 1.0 g per 100 g of sample.

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